

mington and Fort Macon; in the Gulf states, they are mostly from the north; in the upper Mississippi and Missouri valleys, from the northwest; in the northern slope, from west and southwest; in the middle plateau, from northwest, and in California they are mostly northerly.

TOTAL MOVEMENTS OF THE AIR.

[In miles.]

In the following table are given the stations reporting the largest and smallest total movements of the air in each of the various districts:—

Districts.	Stations reporting largest.	Miles.	Stations reporting smallest.	Miles.
New England.....	Mt. Washington, N.H.	32,404	New London, Conn.	4,841
Middle Atlantic states.....	Del. Breakwater, Del.	11,571	Lynchburg, Va.	3,131
South Atlantic states.....	Hatteras, N. C.	12,159	Jacksonville, Fla.	1,493
Florida peninsula.....	Key West.....	8,765	Cedar Keys, Fla.	5,258
East Gulf.....	Starkville, Miss.	6,805	Montgomery, Ala.	4,137
West Gulf.....	Galveston, Tex.	10,999	Little Rock, Ark.	3,982
Rio Grande valley.....	Brownsville, Tex.	8,017	Eagle Pass, Tex.	4,651
Ohio valley.....	Champaign, Ill.	7,379	Indianapolis, Ind.	3,764
Tennessee.....	Nashville.....	5,597	Knoxville, Tenn.	4,545
Lower lakes.....	Rochester, N. Y.	11,190	Toledo, Ohio.....	6,346
Upper lakes.....	Milwaukee, Wis.	9,363	Escanaba, Mich.	5,529
Extreme northwest.....	Moorhead, Minn.	7,514	Saint Vincent, Minn.	5,152
Upper Mississippi valley.....	Saint Louis, Mo.	6,937	Dubuque, Iowa.....	2,492
Missouri valley.....	Huron, Dak.	6,543	Leavenworth, Kans.	3,993
Northern slope.....	Fr. As. in. in. in. Mont.	9,647	Deadwood, Dak.	1,649
Middle slope.....	Fort Elliott, Tex.	6,618	Denver, Colo.	2,499
Southern slope.....	Fort Sill, Ind. T.	7,660	Fort Davis, Tex.	4,323
Southern plateau.....	Fort Grant, Ariz.	6,395	Silver City, N. Mex.	2,958
Middle plateau.....	Pioche, Nev.	4,835	Salt Lake City, Utah	2,590
Northern plateau.....	Eagle Rock, Idaho.	4,530	Fort Missoula, Mont.	2,605
North Pacific.....	Portland, Oreg.	3,124	Roseburg, Oreg.	1,730
Middle Pacific.....	Cape Mendocino, Cal.	12,129	Sacramento, Cal.	3,817
South Pacific.....	San Diego, Cal.	4,699	Visalia, Cal.	2,249

* No record at Pike's Peak during the month.

HIGH WINDS.

On the summit of Mount Washington, New Hampshire, there was only one day during the month on which a maximum velocity of less than 60 miles per hour was recorded, viz.: 56 nw., 22d. The wind reached or exceeded 80 miles per hour as follows: 109 nw., 1st; 94 nw., 2d; 80 w., 4th; 92 nw., 5th; 80 nw., 6th; 90 nw., 7th; 84 nw., 9th; 90 nw., 10th; 98 nw., 12th and 14th; 84 w., 16th; 101 nw., 17th; 72 nw., 19th; 80 nw., 21st; 94 sw., 25th; 100 nw., 26th; 126 nw., 27th, maximum for month. On the 17th, the daily movement was 1,825 miles, or an average hourly velocity of 76 miles for twenty-four hours. This is the greatest daily movement ever recorded at this station.

Cape Mendocino, California, 52 se., 11th; 80 se., 12th; 78 se., 13th; 56 se., 17th.

Other stations reporting high winds are as follows: Indianola, Texas, 60 n., 17th; Galveston, Texas, 59 n., 17th; Portsmouth, North Carolina, 56 ne., 12th; Barnegat City, New Jersey, 52 nw., 12th; Delaware Breakwater, Delaware, 52 sw., 4th; Fort Elliott, Texas, 52 n., 16th; Cape May, New Jersey, 48 nw., 21st and 27th; Fort Grant, Arizona, 48 se., 19th; Rochester, New York, 48 n., 25th.

LOCAL STORMS.

Sandusky, Ohio, 14th.—At 4.45 p. m. a cloud of inky appearance was observed in the west approaching with great rapidity. Just before reaching the city the atmosphere became filled with a yellowish haze resembling the setting sun. At 4.57 p. m. the storm struck this place, accompanied by heavy rain. It was of about three minutes duration, during which time the wind blew at the rate of seventy-two miles per hour and caused great damage in and about the city. After the passage of the storm the wind backed to south and it became very warm.

VERIFICATIONS.

INDICATIONS.

The detailed comparison of the tri-daily indications for February, 1883, with the telegraphic reports for the succeeding twenty four hours, shows the general average percentage of verifications to be 89.49 per cent. The percentages for the four elements are: Weather, 89.02; direction of the wind, 90.45; temperature, 89.04; barometer, 89.47 per cent. By geographical districts, they are: For New England, 80.11; middle Atlantic states, 88.86; south Atlantic states, 90.54; eastern Gulf, 89.77; western Gulf, 92.31; lower lakes, 89.26; upper

lakes, 90.43; Ohio valley and Tennessee, 91.34; upper Mississippi valley, 88.60; Missouri valley, 84.66; north Pacific, 80.95; middle Pacific, 92.31; south Pacific, 93.75.

There were eighty-six omissions to predict (thirteen being due to absence of reports from the Pacific coast) out of 3,444, or 2.50 per cent. Of the 3,358 predictions that have been made, eighty-two, or 2.40 per cent., are considered to have entirely failed; fifty-two, or 1.55 per cent., were one-fourth verified; two hundred and seventy-eight, or 8.28 per cent., were one-half verified; three hundred and seventy-two, or 11.08 per cent., were three-fourths verified; 2,574, or 76.66 per cent., were fully verified, so far as can be ascertained from the tri-daily reports.

CAUTIONARY SIGNALS.

During February, 1883, ninety-two cautionary signals were displayed. Of these, seventy-five, or 81.5 per cent., were justified by winds of twenty-five miles per hour or more, at or within one hundred miles of the station. Seventy-two cautionary off-shore signals were displayed, fifty-seven of which, or 79.3 per cent., were fully justified; sixty-five, or 93 per cent., were justified as to velocity, and sixty-one, or 84 per cent., were justified as to direction. Twenty-nine cautionary signals were changed to off-shore signals. One hundred and sixty-four signals of all kinds were displayed, and one hundred and thirty-two, or 80.4 per cent., were fully justified. These do not include signals ordered at display stations, where the velocity of the wind is only estimated. Ten signals were ordered late.

One hundred and sixteen winds of twenty-five miles or over per hour were reported, for which signals were not ordered; many of these were high local winds or strong sea-breezes.

NAVIGATION.

STAGE OF WATER IN RIVERS.

The highest and lowest stages of water observed at the Signal-Service stations, during the month of February, 1883, are shown in the following table:—

Heights of rivers above low-water mark, February, 1883.

Stations.	Danger-point on gauge.	Highest water.		Lowest water.	
		Date.	Height.	Date.	Height.
<i>Red River:</i>	<i>ft. in.</i>		<i>ft. in.</i>		<i>ft. in.</i>
Shreveport, La.	29 9	28	21 2	11	15 9
<i>Arkansas:</i>					
Little Rock, Ark.		19	20 10	4	4 1
Fort Smith, Ark.		17	14 9	9	*—2 11
<i>Missouri:</i>					
Yankton, Dak.†	20 0				
Omaha, Neb.†	10 0				
Leavenworth, Kans.‡	21 0	26	8 9	28	6 5
<i>Mississippi:</i>					
Saint Paul, Minn.†	14 6				
La Crosse, Wis.†	18 0	25 to 28	3 4	19	2 10
Dubuque, Iowa†	21 10				
Davenport, Iowa†	15 0				
Keokuk, Iowa‡	14 6	19	16 4	18	15 9
Saint Louis, Mo.	30 0	26	26 3	13	5 4
Cairo, Ill.	40 0	26, 27	52 2	6	28 11
Memphis, Tenn.	34 0	28	35 7	1 to 5	22 11
Vicksburg, Miss.	41 0	28	42 2	1	24 7
New Orleans, La.†	—2 6	27, 28	—3 0	1	—9 1
Port Eads, La.		16	10 1	7 to 10	9 2
<i>Ohio:</i>					
Pittsburg, Pa.	20 0	8	27 6	3	5 6
Cincinnati, Ohio	50 0	15	66 4	3	26 10
Louisville, Ky.	24 0	16	44 5	3	11 2
<i>Cumberland:</i>					
Nashville, Tenn.	42 0	13, 14	41 5	4	14 5
<i>Tennessee:</i>					
Knoxville, Tenn.		7, 8	8 6	4	2 3
Chattanooga, Tenn.	31 0	10	17 7	5	7 6
<i>Monongahela:</i>					
Pittsburg, Pa.	29 0	8	27 6	3	5 6
Morgantown, W. Va.	28 0	8	24 4	24	4 6
<i>Savannah:</i>					
Augusta, Ga.		26	17 0	18	7 6
<i>Willamette:</i>					
Portland, Oreg.		2, 3	16 7	7	1 8
Umatilla, Oreg.†					
<i>Sacramento:</i>					
Red Bluff, Cal.		14	2 9	8	1 4
Sacramento, Cal.		15	11 8	11	9 4
<i>Mobile:</i>					
Mobile, Ala.		1	17 4	19, 21	14 5
<i>Colorado:</i>					
Yuma, Ariz.		22	16 8	1 to 4	15 0

* Below bench-mark. † Below high-water mark of 1874. ‡ Frozen the entire month. § Frozen part of month. See text.

The Mississippi river remained frozen during the month at Keokuk, Iowa, and at all points north of that station. At Keokuk on the 18th, the river, although frozen, rose rapidly and during the afternoon was fifteen inches above the danger-line. On the 19th, the river continued to rise, causing great alarm. During the afternoon of the 20th, the ice started but became stationary about sunset.

At La Crosse, Wisconsin, the ice was cut away from the river-gauge and observations were made after the 18th, but the river remained frozen over; the ice being twenty inches thick on the 19th, and showed no signs of breaking.

The Cumberland river rose to within seven inches of the danger-line at Nashville, Tennessee, on the 13th and 14th.

The highest stage of water was observed at Saint Louis, Missouri, on the 26th, at which time the river was three feet, nine inches below the danger-line.

At New Orleans, Louisiana, the river was within six inches of the danger-line at the close of the month. For the stages of water in the Mississippi, at stations northward to Cairo, Illinois, and in the Ohio river—see table showing daily observations, published in connection with the description of February floods.

The Missouri continued frozen throughout the month at Yankton, Dakota, and Omaha, Nebraska. At Leavenworth, Kansas, the ice began to move on the 22d, and river observations were resumed on the 26th.

FLOODS.

The floods of February, 1883, have been very destructive, and especially so in the Ohio river and its tributaries, and in the Mississippi river south of Cairo, Illinois, but up to the close of the month the greatest damage had been done in the Ohio valley. The Ohio river was above the danger-line at Pittsburg, Pennsylvania, from the 5th to the 8th, and again on the 12th, 16th, and 17th. At Cincinnati, Ohio, the river rose to the danger-line on the 8th, and remained above until the 23d. At Louisville, Kentucky, it rose to the danger-line on the 8th, and remained above until the 25th. At Cairo, Illinois, the danger-line was reached on the 13th, and at the end of the month, the river was fifty-two feet above low-water mark and twelve feet above the danger-line; it was stationary on the 26th and 27th, and fell two inches on the last day of the month. At stations on the Mississippi below Cairo, the water had not attained its greatest height at the close of the month, but the river was above the danger-line as far south as Vicksburg, Mississippi, on the 20th.

The following reports concerning the floods which have occurred during the month have been collected by the Signal Service:—

Pittsburg, Pennsylvania, 4th.—The gorges in the various creeks at the head waters of the Alleghany broke, and at noon, the river at this place was filled with large floating ice, and was rising eight inches per hour. The water from the Alleghany backed into the Monongahela, and caused that river to rise considerably. The principal losses were to property along the Alleghany, and are estimated at \$50,000. Several bridges were washed away, and railroad and telegraphic communication was interrupted. Both of the rivers continued to rise during the night, and on the 5th, the lower parts of Pittsburg and Alleghany City were submerged, causing great damage. On the 6th, both rivers fell rapidly, but the heavy rains of the 7th, caused them to rise again; several coal barges were carried down the river and sunk below the city; all of the lower parts of the city were inundated. On the 8th, the mills on the south side of the river were compelled to suspend work, and the tracks of the Pittsburg and Lake Erie, and the Allegheny Valley railroads were under water. On the 9th, the rivers fell below the danger-line.

Marietta, Ohio, 12th.—The dwellings and stores which were recently flooded are now being cleaned. The loss to Marietta is estimated to be from \$50,000 to \$100,000.

Ironton, Ohio, 13th.—The Ohio river began falling at this

place at 1 a. m.; it lacked more than one foot of reaching the highest stage of 1847. All houses between Third and Fourth streets in West Ironton, were entered by water. The mills have stopped work. Over two hundred families were driven from their homes. The track of the Scioto Valley railroad was covered. No trains have arrived from Sciotoville, Ohio, since the 10th.

Portsmouth, Ohio, 12th.—The Ohio river is sixty-four feet and still rising; all business suspended on this date. The water was four feet deep in the Western Union telegraph office. A vast sheet of water extended from the north side of Second street to South Sixth street, which is the only place in the city where the water has not reached. Three-fourths of the city is under water. Public schools were closed and court adjourned. The citizens relief committee cared for over six hundred persons who were rendered destitute.

Maysville, Kentucky, 12th.—At 4 p. m., the Ohio river was within twenty-two inches of the great flood of 1832, and within eighteen inches of that of 1847. The water on the Fleming turnpike, at a distance of one mile from the city, is five feet deep. All mills, factories, foundries and coal elevators were compelled to abandon work. The village of Chester, about two miles southeast of Maysville, is completely submerged, and a large part of East Maysville is also covered.

At Cincinnati, Ohio, the river rose to the danger-line on the 8th, and continued to rise rapidly. At 1.30 p. m. of the 11th, the river had risen to sixty feet, nine inches; being ten feet, nine inches above the danger-line. The lower part of the city was inundated for a distance of four squares from the river front. Great quantities of merchandise and household goods were ruined, and several walls were undermined. In the evening, the gas-works were compelled to shut down, leaving the city in partial darkness. All of the engines at the water-works were stopped, the water covering the floors of the building. The superintendent and engineer of the city water-works issued an appeal to the citizens, requesting an economical use of water, there being only six day's supply in the reservoirs. Business in the lower parts of the city was suspended, and all efforts were made by the merchants to remove their wares to places of safety. A large number of dwellings were flooded, compelling the occupants to seek shelter at the police-stations, many of whom escaped with nothing but their clothing. The cities of Covington and Newport, on the Kentucky shore were partly flooded, compelling the residents of the submerged localities to remove to higher ground. In Newport, from 2,000 to 3,000 people were driven from their homes, many of whom were sheltered in the court-house, school-houses, and other public buildings.

On the 12th, the river rose steadily, increasing the disasters and prostration to business. Associations of charity were organized for the relief of those rendered destitute. At Covington, Kentucky, on the opposite shore, the gas was cut off at 10 p. m., and the water-works were compelled to stop. The damage to Covington property, to date, is estimated at \$75,000. At 10.30 p. m., the river reached the highest point of the great flood of 1832. But few of the railroads were able to run trains in or out of the city, and steamers were engaged to ply between this city and other points where connection with the various roads could be made with convenience. Cummins-ville, a suburb of Cincinnati, is almost entirely under water, and the inhabitants are moving to higher ground, or to the second floors of their dwellings.

On the 13th, the river rose to sixty-five feet, one inch, and during the evening, there was a slight fall. Large quantities of debris of various kinds were carried down the river; one saw-mill and several houses were swept past the city by the current. All railroad communication was cut off; passengers were carried in vehicles to reach the cars at points outside the city. Relief-boats were used for distributing food, etc., to the people who remained in the upper stories of their dwellings. A large part of the Southern railroad depot sank into the water, together with a section of the track and a number of

freight-cars. The damage to the depot and surrounding buildings, with their contents, will aggregate \$10,000. The depot was built upon "made ground," and a hollow west of it had been filled with water for several days previous to the accident, which gradually undermined the building.

14th.—At 1.30 p. m., the height of the river was sixty-five feet, three inches. All of the railroads were under water except that of the Cincinnati, Hamilton, and Dayton company. No change occurred on the street-railways; the cars continued to run on the lines not heretofore abandoned. In this vicinity about 2,500 houses have been submerged, of which number more than 2,000 were in Newport, Kentucky. The associated charities are very active in their efforts to relieve the destitute. The Ohio legislature, on this date, passed a bill authorizing the loan of \$100,000 for the relief of the flood sufferers.

15th.—At 4.05 a. m., the highest point, sixty-six feet, four inches, was reached, and the river remained stationary until 6 a. m., when it began to fall slowly.

On the 16th, the Plum-street depot was filled with water to depth of about twenty feet. The city still remains in darkness. At 1.30 p. m. of the 17th, the river was sixty-two feet, two inches, being two feet, one inch lower than at the same hour of the previous day. In the "Cincinnati News," of this date appeared the following note in reference to the value of the flood-warnings given by the Signal Service:

The United States Signal-Service department has been of great service during the flood, * * * and their timely warnings have been instrumental in saving over \$1,000,000 worth of goods, in this city alone. Each rise has been prophesied from twelve to twenty-four hours in advance of its arrival, and the merchants promptly notified, thus enabling them to remove to places of safety. * * * Those most benefitted by these admonitions recognize their value and fully appreciate the services rendered. The observer in charge of the signal office in this city has worked diligently to place his bulletins before the public, * * * and to him the merchants of the city have tendered their thanks.

18th.—The river fell one foot, ten inches during the twenty-four hours, ending at 1.30 p. m., being six feet below the highest point reached.

19th.—The river fell one foot, five inches during the twenty-four hours, ending at 1.30 p. m. The work of clearing dwellings and business houses in the overflowed districts has begun.

20th.—A fall of one foot, six inches, has occurred during the twenty-four hours, ending at 1.30 p. m. The gas companies are again able to furnish the city with gas, none having been supplied since the 11th.

21st.—The river, at 1.30 p. m. had fallen one foot, eight inches, during the preceding twenty-four hours, being at that hour, fifty-five feet, nine inches above low-water mark. In the "Cincinnati Commercial Gazette," of this date, is published an itemized estimate of damages caused by the flood. Reports from one-half of the submerged district show that the actual damages will aggregate about \$800,000; and it is estimated that the total loss will reach \$1,500,000. The losses resulting from the suspension of business is considered much greater than the value of the property destroyed.

22d.—During the last twenty-four hours, the river has fallen two feet, eight inches. The chief of police reports the total number of inundated business houses in the submerged districts to have been, 1,548; residences and tenement houses, 2,548; passenger and freight depots, seventeen; police-stations, two; coal yards, fifteen.

23d.—The effects of the floods upon the railroads have now been practically removed, and all through and local trains are again running on schedule time. The river has fallen nine inches below the danger-line.

Lawrenceburg, Indiana, 12th.—At 4 p. m., this city was entirely cut off from all kinds of communication, with the exception of an occasional steamer. The city was surrounded by water generally ranging from twenty to sixty-five feet in depth; at the highest point within its limits the water was at least five feet deep, and swift currents rushed through the streets. The citizens were compelled to take refuge in churches, factories, and other places of safety.

13th.—The continued rise in the river has compelled more families to desert their houses. Between 5,000 and 6,000 persons have been rendered dependent upon the outside world for food, all of the supplies being under water. Great suffering from hunger and exposure is experienced.

14th.—The river began falling slowly during the morning. In the evening, one end of a furniture warehouse on High street fell in; about thirty persons were sheltered in the upper stories of the building, all of whom escaped uninjured. The warerooms were stored with \$20,000 worth of furniture, which will prove almost a total loss. The market-house, with \$10,000 worth of furniture, was swept away.

20th.—As the water recedes, the damage to property becomes more apparent. At least one-half of the householders will lose all of their effects. The following are some of the heaviest losers: Henry Fitch, lumber, \$20,000; Ohio Valley Coffin Company, \$10,000; Graham & Marshall, lumber, \$12,000; E. B. Dobell, furniture, \$5,000; Baldwin & Dobell, furniture, \$3,000; and Snyder's carriage factory, \$2,000. The individual losses cannot be estimated, but will aggregate an immense sum. The buildings entirely destroyed are as follows: Eight manufacturing establishments; three barns, and forty dwellings. Those swept from their foundations are: One hundred and seventy-nine dwellings; one hundred and thirty-three barns; nineteen shops; six business houses, besides Floral Hall, at the Fair Grounds, and innumerable outbuildings and sheds.

Aurora, Indiana, 14th.—The river reached a point three and one-half feet above the great flood of 1832, and at 10 p. m. began to fall. Many dwellings have been flooded or swept away.

Hamilton, Kentucky, 15th.—The Ohio river at this point is rapidly rising, and the village is totally submerged. Nearly all families have deserted their homes. Normansville, a small village about one mile from the river, is inundated, and all dwellings have been abandoned. The back-water is doing great damage along the creeks for miles into the country.

Vevay, Indiana.—The water attained its greatest height at this place on the 15th, being thirty-nine inches above the great flood of 1832. Many citizens were driven from their homes, and houses, barns, fences, and other movable objects swept away.

Madison, Indiana, 12th.—The Ohio river is now within thirty-four inches of the great flood of 1832, and is rising at the rate of two inches per hour. The depot and all of the factories and houses on the river front are inundated.

Jeffersonville, Indiana, 14th.—There are only about eight blocks in the city that are not under water. All of the public buildings are filled with people rendered homeless. Much damage has been done at the two ship-yards, and at the glass-works the loss is estimated at \$100,000. The Ninth-street depot is standing in nine feet of water.

16th.—Additional numbers of families have left their homes for places of safety. The destitute are now supposed to number 7,000. The central part of the city is ruined and there can be no estimate of the amount of damage. Great suffering from hunger and exposure prevails.

Louisville, Kentucky.—The first telegram from the Chief Signal Officer, giving warning of the approaching flood was received on the morning of the 5th, and was bulletined in the city. At this time, the river was more than ten feet below the danger-line. It fell six inches during the succeeding twenty-four hours, after which it rose rapidly. During the twenty-four hours ending at 1.25 p. m. of the 8th, it rose eight feet, eight inches, the gauge then reading twenty-four feet, five inches, or five inches above the danger-line.

9th.—During the last twenty-four hours the river rose four feet, three inches.

10th.—The river continues to rise, and has flooded a number of houses on the river front, causing suspension of business in that locality.

11th.—The river is now ten feet, eleven inches above the danger-line and continues to rise.

12th.—A rise of two feet, nine inches has occurred during the last twenty-four hours. Several thousand people have been driven from their homes by the encroaching water. At 11 p. m., the cut-off dam was broken. This dam was forty feet thick at the top, increasing to two hundred feet at its base, and was 2,000 feet in length. It protected a valley extending to Jackson street and from the Short-Line railroad fill almost to the river, where there is a high levee. The back-water which pressed upon the dam at the "cut-off" extended back as far as the eye could reach, and was sixty feet deep. In the valley mentioned there were two hundred and fifty houses, mostly of light frame structure, and in five minutes after the bursting of the levee, not a house remained standing. The scene was a frightful one, being intensified by darkness, as every light was almost instantly extinguished.

13th.—The river has risen three feet and four inches during the last twenty-four hours. People are busily engaged in constructing rafts, for the purpose of removing furniture, etc. All of the mills and factories fronting on the river have stopped. Great distress has been caused in the overflowed district. Along Front street, the water is up to the second stories of the houses, and in Portland, a suburb of Louisville, an area of ten squares is under water.

14th.—The river continues to rise, and the situation becomes more serious. At 9.25 p. m., the river marked forty-two feet, nine inches, surpassing the great flood of 1832. Up to this date, nine persons are known to have been drowned.

15th.—The height of the river, this morning, was forty-three feet, five inches, or more than nineteen feet above the danger-line. Further damage has been done by the overflow of Bear-grass creek, which runs through the eastern part of the city. The whole of Brent street was flooded to a depth of about ten feet and resulted in the bursting of several sewers. During the day, a frame church building and several houses were loosened from their foundations, and were floated down the river. Many houses were saved by anchoring them to trees, telegraph poles, and other objects. Relief-boats supplied food to the destitute at many points along the river.

16th.—The river reached its maximum height this evening, being forty-four feet, five inches on a temporary gauge, (all others gauges are covered;) it is probable that this reading is four or five inches too low. The city gas-works were submerged during the evening, leaving the city in darkness. The amount of damage done in this city as compiled by the "Courier-Journal" is estimated at \$367,500. The present flood has reached a point three feet higher than that of a great flood of 1832.

17th.—A fall of four inches has occurred during the last twenty-four hours. The situation remains unchanged; no further damage has been done, with the exception of the washing away of a few old buildings.

18th.—The river has fallen one foot, three inches and is still receding. The gas company is yet unable to supply the city with gas.

19th.—The river continues to fall, and there is now less than three feet of water on Fulton street. The water over the lowlands having no outlet except through the small sewers, is passing off very slowly, and it will be weeks before people can return to their homes.

20th.—The river continues to fall at the rate of one and one-half inches per hour. The water-works resumed operations today, not having sustained the least damage during the flood. The city is now partly supplied with gas.

21st.—At 1.25 p. m. the river marked thirty-six feet, seven inches, and was falling one and one-half inches per hour. It is thought that business will be resumed on Front street in about one week. At Point Portland and Shipping Port, it will require weeks of labor and thousands of dollars to repair the damage done. The damage to the cut-off dam is estimated at \$30,000.

During the twenty-four hours ending at 1.25 p. m. of the 23d, the river had fallen three feet; it continued to fall rapidly and was again below the danger-line on the 25th.

New Albany, Indiana, 12th.—During the last twenty-four hours, the water has entered the Depauw American Plate-glass works, and has ruined every furnace in the entire twenty-five acres of the works. All of the furnaces will have to be rebuilt; the loss is estimated at \$100,000. Three-fourths of the factories in the city and not less than five hundred houses have been flooded, causing a loss of at least \$250,000. From 2,500 to 3,000 employes of the factories are out of work. The track of the Air Line railway, in the west end of the city, was six feet under water and preventing trains from entering.

16th.—The water is now nearly three feet higher than the great flood of 1832. The distress and suffering are very great. The damage is estimated at \$1,000,000, and 5,000 people are homeless.

20th.—The total number of families in the city who are being provided with daily supplies by the relief committee, and who will be dependent upon them for several weeks, is officially reported to aggregate 2,071. It will cost \$200,000 to repair buildings. The city loses heavily in sewers and bridges. Previous reports of damages have not been exaggerated, and the losses to the city will not be less than \$1,000,000.

26th.—The receding river discloses a great amount of damage that has been hidden by the water.

Evansville, Indiana, 16th.—The river is rising rapidly, and this evening marks forty-seven feet. The Louisville and Nashville yards are covered with water, and all work is stopped. The water is backing up into the sewers and is forcing its way into the streets. Reports from Posey county state that nearly the whole of Bethel township is under water.

26th.—The river is falling very slowly, and is not more than two feet lower than the highest point reached here.

Caseyville, Kentucky, 26th.—The town is completely inundated, excepting a few residences on a high bluff. All of the business houses are under water, and the stocks of goods ruined.

Shawneetown, Illinois, 24th.—The water in the river is five feet higher than ever before known, and is still rising. The town has been under water for three weeks. The river is from five to thirty miles wide, and it will be several weeks before the water will subside. Several hundred houses have been swept away and hundreds of people are without homes, food, or clothing. The actual loss in this immediate vicinity will exceed \$250,000.

26th.—Almost the entire population is now confined to the upper stories of their dwellings. The river is still rising, owing to the great volume of water from the swollen Wabash.

The preceding reports are from stations situated along the Ohio river, and are arranged in the order in which they would be successively passed proceeding southward from Pittsburg.

The Signal-Service observer at Cairo, Illinois, reports as follows: The stage of water in the Ohio river on the 26th and 27th,—fifty-two feet, two inches,—is the highest water ever recorded at Cairo, and is three and one-half inches above the highest point of the flood of 1882, which occurred February 25th and 26th. The present flood has submerged the lowlands to a vast extent in the immediate vicinity of Cairo, causing loss of stock, the value of which will amount to thousands of dollars. At Bird's Point, a small settlement on the Missouri shore near the mouth of the Ohio, a few houses have been crushed by the heavy driftwood and floating ice. At the latter place, a number of persons were compelled to abandon the lower stories of their dwellings. The telegraph and railroad companies also sustained losses in consequence of the flood. The telegraph company had a large number of poles washed away, and the railroads were badly damaged. The city of Cairo has sustained but little or no loss as regards property. From \$3,000 to \$4,000 have been expended in bulkheading and guarding the levees surrounding the city, (a distance of about seven miles.) These bulkheads are built on the top of the levees, and are constructed by driving stakes into the earth a few feet apart and nailing planks to the uprights, against which an embankment of earth is thrown on the side

from the river. The same means were employed at Mound City, Illinois, eight miles above Cairo, and successfully prevented the overflow. Mound City was submerged by the flood of 1882. The depth of water on the bulkheads during the recent high stage of water varied from two inches to two feet. As the greater part of Cairo is from ten to sixteen feet below the levees, an overflow would result most disastrously. Much property has been saved by the warnings furnished by the Chief Signal Officer.

Columbus, Kentucky.—The levee at this place broke on the 17th, and on the 21st, the town was submerged to an average depth of ten feet. All business has been suspended, only two business houses and a hotel being above the water. The track of the Saint Louis, Iron Mountain, and Southern railroad is washed away between here and Charleston, Missouri. Great losses of stock have occurred in the bottom lands above and below here. Belmont, Missouri, on the opposite shore, is also submerged.

Memphis, Tennessee, 11th.—A telegram from the Chief Signal Officer was received on this date, announcing dangerous floods in the Ohio river, and copies were furnished to the press and to the exchanges. On the 14th and 15th, additional telegrams were received from the Chief Signal Officer, predicting dangerous floods in the Mississippi at and below Cairo, Illinois, and advising the removal of property to points above the danger-line. These telegrams were also furnished to the press and the exchanges. The following reports show to what extent the flood prevailed at this station during the remainder of the month:—

19th.—The river has risen seven inches during the last twenty-four hours; it is now within eight inches of the danger-line, and two feet, nine inches below extreme high-water. The water is going through the breaks at Trotter's, eighty-five miles below, and also at Friar's Point, Mississippi. The warehouses at Concordia, Mississippi, which are located between the river and levees, are surrounded by water. Up to this date, no loss has been sustained between Memphis and Cairo. The levees between Friar's Point and Arkansas City have been made three feet higher than they were last year.

21st.—A rise of six inches occurred during the last twenty-four hours, and the river is three inches above the danger-line. The high water is doing serious damage to the corn that is piled up along the river bank, awaiting shipment. The water, in many places, covers the second layers of sacks, and thousands of bushels will necessarily be ruined. Suspension of work has also been caused on the proposed Kansas City, Springfield, and Memphis railroad.

22d.—The river is nine inches above the danger-line, having risen six inches during the last twenty-four hours.

23d.—Suspension of travel has been caused over the Memphis and Louisville railroad from this city to Madison, Arkansas, a distance of forty miles westward. The back-water from Ten Mile Bayou covers the track to a depth of six inches and is rising rapidly. The local packets are busily engaged in removing laborers and stock to places of safety, as the water is encroaching upon several farms below Memphis and Helena, through the breaks that were not repaired. None of the newly-built levees have shown any indications of breaking.

24th.—It is now a certainty that all that country from New Madrid, Missouri, to Helena, Arkansas, and from the river westward to Crowley's ridge will be inundated. This area is about two hundred and twenty-five miles in length with an average width of forty miles. Thousands of bushels of corn will be lost, and large numbers of mules, horses, cows, and hogs will be drowned. There yet remains considerable cotton in the fields, which will also be lost together with the cottonseed.

26th.—The water is within seven inches of extreme high water. No further damage to levees has been reported.

27th.—No change has occurred in the river during the last twenty-four hours. The back-water is still rising rapidly in the lowlands, causing loss of stock. Steamers use every precau-

tion in passing levees that are weak, as the waves from the boats have a tendency to loosen the earth. The river rose two inches on the last day of the month.

Helena, Arkansas, 23d.—The Mississippi continues to rise at the rate of five inches in twenty-four hours. The overflow in Crittenden county has stopped the running of trains over the Memphis and Little Rock railroad. The lowlands are being rapidly covered with water. Reports from Austin, Tunica county, Mississippi, state that the water from the river is rushing through the breaks at that place, and the inhabitants are leaving for higher localities.

24th.—Reports from Lee county, Arkansas, state that the Saint Francis river is rising rapidly. The whole country for a distance of eight miles from the mouth of the river, with the exception of a small piece of ground, is under water. No great damage has yet occurred, and if the water recedes by the middle of March, good crops may be made. The water is rapidly covering the country north of the Helena levee, one and one-half miles north of here, and has reached the road at the base of hills running to Phillips Bayou. The inhabitants in this locality are moving their stock and making fast their possessions to prevent them from floating away. Paramore road at Clarendon is under water and the town is becoming rapidly flooded.

27th.—The river has risen three inches during the last twenty-four hours, and the water is now even with Front street and on a level with the entrances to the business houses on a part of Main street. Preparations are being made to prevent further encroachment by throwing up temporary levees. The levee below Helena is still firm and intact. The Saint Francis and White rivers are still rising, and the people are preparing to secure their houses and other property.

Vicksburg, Mississippi, 21st.—The river is within one foot of the danger-line. No alarm is felt as it will require a rise of three feet to overflow its banks at all points in this section.

27th.—The lowlands in Louisiana are reported to be submerged; but little damage has, so far, occurred.

The above reports are from stations located on either side of the Mississippi between Cairo, Illinois, and Vicksburg, Mississippi. The following are reports of damaging floods occurring mostly in the smaller rivers and streams, and will be found arranged by states, in alphabetical order:—

Arkansas.—Clarendon, Monroe county: the White river at this place has begun to overflow, and threatens to flood the lower parts of the town. No efforts have been made to strengthen the levees at this place.

Illinois.—Clinton, De Witt county, 20th: reports from central Illinois, state that the large streams are rising, and great damage is threatened. Many fields of wheat have been ruined by the overflow, and the damage to various kinds of property is estimated to be from \$40,000 to \$60,000.

Springfield, 16th: The melting of snow and the late heavy rains have swollen the streams in this vicinity, causing great destruction of property and loss of life. The city water-works were submerged during the morning, and the pumping was discontinued.

Jerseyville, Jersey county, 16th: The bottom-lands and creeks in this vicinity are flooded. Macoupin and Phills creeks are higher than ever known. Great damage has been done to railroads, and travel has been delayed.

Peoria, 16th: No damage has been done by floods at this place, but lower Peoria, known as Goose lake, is flooded and the people are moving out. The railroad bridge at Kickapoo creek has been washed away. The Chicago, Rock Island, and Pacific railroad track is flooded north of this place. Trains are water-bound between Princeton and Stark. Two bridges on the Chicago, Burlington, and Quincy road have been washed away.

Champaign, Champaign county, 16th: All streams in this vicinity are much swollen and are overflowing their banks.

Indiana.—Lafayette, Tippecanoe county, 16th: The flood in the Wabash is unprecedented. The river is twenty inches higher than ever known and is still rising. The machinery at the water-works is submerged and the city's water supply is cut off.

Wabash, Wabash county, 20th: At 7 p. m. of this date, the river rose to high-water mark of 1875, and is still rising. The levees are broken in many places, and a large part of the country is flooded. The McNeil levees, six miles below here, broke during the night and the water covered the lowlands, sweeping away fences, corn, hay, stock, etc. Great damage has been done to the various railroads by washing away the tracks and bridges and flooding the road-beds.

Iowa.—Davenport, 16th: the heavy rains have caused wash-outs on the railroads, and all creeks are swollen, causing delay of travel. Duck creek rose twenty eight feet, covering the railroad with several feet of water, and lodging large cakes of ice upon the track.

Keokuk, 16th: the lowlands and railroad tracks are flooded in this vicinity, and several bridges have been washed away.

Kentucky.—Cynthiana, Harrison county, 12th: the Licking river continued to rise until midnight, when it became stationary. Communication with the surrounding country, east and west of the town is entirely cut off. Several distilleries and flour-mills were surrounded by water and compelled to shut down.

Boston, Nelson county, 12th: the Licking river, at 9 a. m., was twenty-nine feet, four inches, being the highest point reached during the last ten or fifteen years. At 1 a. m., it began falling slowly. But little damage was done, other than the sweeping away of grain and fodder stacks.

Frankfort, 12th: the Kentucky river is forty-two feet and falling here and at all points above. The river reached a point four feet higher than has ever been known. All distilleries and saw-mills were closed, and great damage has been done to property.

Owingsville, Bath county, 15th: the recent floods have done very great injury to the farmers in this vicinity. Slate creek, near this place, rose to a height two feet higher than was ever known, sweeping away barns, fencing, corn, fodder, etc. The town of Wyoming in this (Bath) county, near the confluence of Slate creek and the Licking river, was entirely submerged. The water rose so rapidly that the inhabitants were compelled to make their escape in boats. At Farmer's, Rowan county, several dwellings and store-houses were washed away. The loss to farmers along the course of Slate creek, in Bath county, alone, is estimated at \$100,000.

Missouri.—Kansas City, 16th: the heavy rains of last night in this vicinity have caused serious damage to railroads; wash-outs have occurred, and travel has been delayed.

Marshall, Saline county, 16th: Salt Fork, a small stream in this county, has overflowed its banks and is over a mile wide at points east of here. Trains are delayed on the Chicago and Alton railroad. The bridge, three miles east of the city, is submerged and the creek at that place is one mile wide.

Hannibal, Marion county, 16th: the thaw of the past two days and the recent heavy rains have proved disastrous to the railroads running into this city. Great damage has been done along the line of the Keokuk and Saint Louis railroad. During the morning, the bridge across the Des Moines river at Buena Vista fell into the river. The streams in this vicinity are much swollen and all railroads are inconvenienced.

New York.—Buffalo, 17th: the second, third, eighth, and thirteenth wards of this city are almost completely inundated, and the Delaware, Lackawanna, and Western railroad bridge is submerged. The lands in the vicinity of the race-track were under four feet of water. Large numbers of pigs and other animals were drowned. No trains have passed over the Buffalo, New York, and Philadelphia road since yesterday afternoon. The Elk-street crossing of the Lake Shore and Michigan Southern railroad is under two feet of water.

Lockport, Niagara county, 17th: the water in Eighteen Mile creek rose fifteen feet, and has swept away the Watertown and Ogdensburg railroad bridge, and also a highway bridge and dam. The loss in this vicinity up to date is \$75,000.

Rochester, 17th: washouts have occurred on the Rochester and Pittsburg railroad at Gainesville, and also on the Buffalo,

New York, and Philadelphia railroad at Arcade and other points; all trains have been laid up on the siding.

Ohio.—Columbus, 5th: the Scioto river rose rapidly all day and continued to rise during the 6th, reaching the highest point ever known on the latter date. A large part of the city, mostly on the west side was flooded. Fifty families were driven from their homes and were sheltered in the school-houses, churches, and other buildings. On the 7th, the river fell slowly, but rose rapidly again on the 11th, causing no damage.

Sandusky, 3d and 4th: the heavy rains have caused all streams to rise rapidly. The Sandusky river rose twenty feet in three hours on the 4th, washing away several bridges. In the town of Fremont, Sandusky county, the water was five feet deep in the principal hotel. All trains were delayed from twenty-four to thirty hours, and the telegraph lines sustained serious damage.

Massillon, Stark county, 15th: the entire trestle-work over the Tuscarawas river at Willow Creek coal-mine was carried away. The Cleveland, Tuscarawas valley, and Wheeling railroad bridge at Bavis Mills, which was recently washed away and replaced, was again carried away. Many stores and cellars of buildings in Massillon were flooded, and all the dwellings near the rolling-mill submerged.

Pennsylvania.—Erie, 3d: the creeks in this vicinity have overflowed their banks, causing interruption to travel and damage to property. In some of the houses on Mill creek, the water rose to the second stories compelling the occupants to leave them.

Lock Haven, Clinton county, 17th: the river at this place has stopped rising, but the flats are covered with water to a depth of several feet, compelling farmers to send the stock to the hills to prevent drowning.

Tennessee.—Nashville, 11th: the river is rising steadily with heavy drift floating; fears are entertained of an overflow.

13th: the river continues to rise. A few houses in the eastern and northern parts of the city are flooded. The back-water over the lowlands in the city is from twelve to seventeen feet deep.

For the purpose of showing the stages of water in the Ohio and Mississippi rivers during the prevalence of the floods, the following table has been prepared. The observations were made simultaneously on each day of the month at 2 p. m., Washington mean time:—

Station.	OHIO RIVER.						MISSISSIPPI RIVER.					
	Pittsburg.		Cincinnati.		Louisville ^a .		Cairo.		Memphis.		Vicksburg.	
Danger-point....	Feet.	In.	Feet.	In.	Feet.	In.	Feet.	In.	Feet.	In.	Feet.	In.
	20	0	50	0	24	0	40	0	34	0	41	0
February 1.....	7	8	28	11	11	8	29	10	22	11	24	7
2.....	6	4	28	1	11	6	29	8	22	11	26	8
3.....	5	6	26	10	11	2	29	6	22	11	28	4
4.....	15	2	31	0	12	0	29	10	22	11	29	7
5.....	24	9	31	1	13	6	29	7	22	11	30	5
6.....	20	1	29	6	13	0	28	11	23	0	31	1
7.....	20	8	43	9	15	9	29	7	23	1	31	7
8.....	26	9	52	10	24	5	31	7	23	0	31	10
9.....	18	0	57	4	28	8	33	3	23	4	32	1
10.....	12	1	59	1	31	7	34	8	24	5	32	5
11.....	10	10	60	9	34	11	36	7	25	11	32	7
12.....	20	7	63	7	37	8	38	7	27	3	33	3
13.....	17	5	65	0	41	0	40	1	28	7	34	0
14.....	12	9	65	3	42	6	41	8	29	8	34	8
15.....	19	2	66	1	43	9	43	10	30	7	35	7
16.....	20	8	64	3	44	5	45	7	31	5	36	7
17.....	20	3	62	2	44	1	47	8	32	3	37	5
18.....	19	9	60	4	42	10	49	4	32	9	38	3
19.....	16	3	58	11	40	5	50	9	33	4	38	10
20.....	13	3	57	5	38	10	51	7	33	9	39	5
21.....	11	1	55	9	36	7	51	10	34	3	40	0
22.....	9	6	53	4	34	0	51	9	34	9	40	5
23.....	8	1	49	3	31	0	51	10	35	1	40	10
24.....	7	1	44	9	27	8	52	0	35	4	41	4
25.....	7	2	41	9	23	0	52	0	35	5	41	8
26.....	8	5	37	8	21	8	52	2	35	6	41	10
27.....	8	3	34	4	17	6	52	2	35	6	42	0
28.....	7	2	30	8	13	0	52	0	35	7	42	2

^a Regular gauge submerged from 8th to 25th, inclusive; observations made at foot of 9th street, and at temporary gauges. † Probably four or five inches too low.

HIGH TIDES.

New York City, 18th, high tide, flooding cellars in West street; Cape Lookout, North Carolina, 20th, 24th.

LOW TIDES.

Cape Lookout, North Carolina, 10th, 15th, very low.

ICE IN RIVERS AND HARBORS.

Penobscot bay.—Bangor, Maine, 4th, the bay is frozen over at Belfast for the first time since 1876.

Thames river.—New London, Connecticut: ice around the docks on 1st, 2d, 3d; ice cleared from docks, 4th; floating ice, 15th.

Passamaquoddy bay.—Eastport, Maine: floating ice in bay 21st, 22d.

Hudson river.—New York City: 1st, a canal-boat, laden with two hundred and eight tons of coal, was sunk in the harbor by ice on this date; 4th, floating ice in river.

Susquehanna river.—Port Deposit, Maryland: 4th, reports from points north of this place, state the river is rising and the ice breaking up, causing great alarm. All of the rolling-stock on the sidings of the various railroads was sent to Canal station, about two miles north. The back-ice from Peach Bottom reached this place about 6 a. m., breaking up the ice between the depot and Rock river. The ice at the lower end of the town is firm, and still holding the heavy pressure of back-ice; 6th, the back-ice is now packed from shore to shore, for a distance of three miles, and is from five to six feet in depth. The ice between Mount Ararat and Havre de Grace still remains firm and unbroken; 17th, the track of the Columbia and Port Deposit railroad is obstructed by water and ice, the latter being piled up to a height of eight feet in places. At McCall's Ferry, twenty-two miles north, the river rose three and one-half feet in twenty minutes. The ice that was dammed for a distance of twelve miles north of that place, is breaking away and moving down the river.

Williamsport, Pennsylvania: 16th, ice is dammed a few miles north of here; 17th, some ice moved to-day, but the ice-dam still remains firm.

Wilkesbarre, Pennsylvania: 20th, the ice has gone out at Nanticoke, but there are no signs of its moving at this place.

Cuyahoga river.—Cleveland: 3d, the ice gave way and passed into the lake without serious damage. During the night an ice-dam formed at the Seneca-street bridge, causing the back-water to overflow the lumber yards and wharves. Heavy dams also forms at the other bridges on the river. The Cleveland, Columbus, Cincinnati and Indianapolis railroad bridge was saved by running heavily loaded cars upon it. 13th, ice-dam formed at the mouth of the river, the ice being packed from the surface of the water to the bottom of the river. 14th, ice-dam at the mouth of river gave way and moved into lake. 15th, an immense dam formed at the weigh-lock, causing the water to overflow the surrounding valley.

Grand river.—Grand Haven, Michigan: 2d, river partly open.

Maumee river.—Toledo, Ohio: 4th, great damage by breaking up of the ice is reported from points above the city; river remains frozen over at this city. On the 17th, at 11 a. m., the ice gave way in front of the city; at about noon an ice-dam formed below the city; at 12.30 p. m., a span of the Cherry-street bridge, and two spans of the Pennsylvania railroad bridge were carried away. The ice-dam extended slowly up the river until it reached the city, causing the water to reach high-water mark of 1881; 18th, the ice-dam broke, carrying away nearly all of the Cherry-street, Pennsylvania railroad, and Union bridges, and also damaging the Wheeling and Lake Erie bridge. The water, which had risen to such an extent as to submerge parts of the city, rapidly receded after the ice-dam broke. Ice continued running from the 19th to 23d.

Saint Clair river.—Port Huron, Michigan: 1st, teams are crossing on the ice between the American and Canadian shores at this place.

Detroit river.—Detroit, Michigan: 14th and 16th, ice moving

out of river; 18th, river frozen; 19th, ice broken; 23d to 27th, large quantities of drift-ice.

Lake Michigan.—Grand Haven: 7th, the steamer "Michigan" was caught in the ice eighteen miles off this harbor and drifted to a point seven or eight miles west of the outer piers. The tug "Arctic" went to the assistance of the "Michigan" and was also caught in the field of ice which covered the lake for a distance of from fifteen to twenty miles westward. On the 9th, the "Arctic" forced her way out of the ice, but was again caught and carried back to her first position in the ice. 10th, the "Michigan" and "Arctic" drifted slowly westward with the ice, and were out of sight at 2 p. m. Both the tug and steamer were run into Muskegon harbor on the 11th, the former being slightly damaged. 12th, the steamer "Wisconsin" lies ice-bound at the mouth of Grand river. 13th, the "Michigan" and "Arctic" arrived at 12.30 p. m. The captain of the former reported that the ice encountered after drifting north-eastward on the 10th surpassed any ever observed during his many years experience as a navigator on the lakes. The thickness of the ice was observed in places to be thirty feet, while the average thickness varied from fifteen to twenty feet. Captain McGregor, of the "Wisconsin," states that there are only about twenty-five miles of open water between Milwaukee, Wisconsin, and this port.

Little Bay de Noquet.—Escanaba, Michigan: bay remained frozen throughout the month.

Straits of Mackinac.—Mackinaw City, Michigan: 5th, the steamer "Algonah" arrived within two miles of the harbor, where she became fast in the ice, which is solid to the bottom in the shoal water.

Lake Superior.—Duluth, Minnesota: 17th, large field of ice moved out into the lake on this date.

Grand Traverse bay.—Traverse City, Michigan: 1st, bay frozen over.

Illinois river.—Havana, Illinois: 23d, at 9 a. m., about three hundred feet of solid ice passed down the river, doing but little damage. The ice still remains solid and extends over two miles up the stream.

Browning, Illinois: 23d, the ice in the river at this place is solid, with no prospect of breaking up.

Wabash river.—Lafayette, Indiana: 16th, the ice in front of the city broke on this date, crushing a number of small houses on the west side. There is a heavy dam at Goose island, seven miles below the city.

Mississippi river.—Alton, Illinois: 16th, the ice-dam at this place is over five miles in length; 22d, the upper dam moved about 11 a. m., carrying away about one-half of box factory on the river and submerging the building. The damage to machinery and building is estimated at from \$8,000 to \$10,000.

Keokuk, Iowa: 20th, ice started during the evening, but became stationary at sunset.

La Crosse, Wisconsin: 19th, ice in river twenty inches thick and shows no signs of breaking.

Saint Louis, Missouri: 2d, light ice running; 14th, river full of ice, and also on 17th and 18th; 19th, river clear of ice.

Cairo, Illinois: 13th, navigation between Saint Louis and this place opened to-day.

Muscatine, Iowa: 27th, teams are still crossing the river on the ice.

Ohio river.—Wheeling, West Virginia: 5th, floating ice.

Pittsburg, Pennsylvania: 4th, the dams in the various creeks at the head-waters of the Allegheny broke about noon, filling the river with large cakes of ice.

Cincinnati, Ohio: floating ice, 8th, 9th.

Missouri river.—Leavenworth, Kansas: 20th, ice shows signs of breaking; 22d, ice moved short distance; 24th and 25th, moved about half a mile; 26th, ice moved about one mile leaving the river clear opposite this station; 28th, the ice-dam below the city broke and moved out, causing a rapid fall in the river.

Kansas City, Missouri: 15th, ice broke in river, and continued running during the remainder of the month.

Lexington, Missouri: 16th, ice-dam broke at 4 a. m., causing no damage.

Hannibal, Missouri: 16th, the river is clear of ice for miles south of the Hannibal bridge, but above that point it is still intact.

Boonville, Missouri: 16th, the ice is very thick and badly dammed at this place.

Jefferson City, Missouri: 16th, ice has broken up and is passing in huge floes.

Willamette river.—Umatilla, Oregon: 1st and 2d, floating ice. 12th, river frozen above and below town; ice being from two to three feet thick. 24th, ice-dam in river at 3 p. m.

Portland, Oregon: 5th and 7th, much floating ice in river.

Kansas river.—Fort Riley, Kansas: 15th, ice broke up in river at 4 a. m., and continued running during the remainder of the month.

Miscellaneous.—West Las Animas, Colorado: 3d, the Arkansas and Purgatoire rivers, rapidly running streams near this place, are frozen to the bottom in many places.

Grampian Hills, Pennsylvania: 15th river free of ice.

TEMPERATURE OF WATER.

The temperature of water as observed in rivers and harbors, at the Signal-Service stations, with the average depth at which the observations were made, are given in the following table. In this table are also shown the highest and lowest observed water temperatures of the month, with the monthly ranges, and the monthly mean temperature of the air for the various stations. At the following stations no observations were made during the month on account of ice: Alpena, Escanaba, Mackinaw City, Marquette and Detroit, Michigan; Buffalo, New York; Chicago, Illinois; Cleveland, Sandusky, and Toledo, Ohio; Duluth, Minnesota; Milwaukee, Wisconsin. Observations were also not made on account of ice at New London, Connecticut, from the 1st to 3d, and at Grand Haven, Michigan, from 1st to 26th.

Temperature of Water for February, 1883.

STATION.	Temperature at bottom.		Range.	Average depth, feet and inches.		Mean temperature of the air at station.
	Max.	Min.				
Atlantic City, New Jersey	39.0	34.9	4.1	6 5	35.1	
Alpena, Michigan*						
Augusta, Georgia	61.0	50.0	11.0	9 4	56.7	
Baltimore, Maryland	37.0	33.0	4.0	9 11	39.1	
Block Island, Rhode Island	35.6	31.8	3.8	8 6	32.1	
Boston, Massachusetts	32.7	29.8	2.9	25 0	29.2	
Buffalo, New York*						
Cedar Keys, Florida	78.0	60.0	18.0	8 5	66.9	
Charleston, South Carolina	59.0	49.6	9.4	38 0	57.2	
Chicago, Illinois*						
Chincoteague, Virginia	47.0	38.0	9.0	5 8	40.2	
Cleveland, Ohio*						
Detroit, Michigan*						
Delaware Breakwater, Delaware	39.4	33.8	5.6	4 2	37.9	
Duluth, Minnesota*						
Eastport, Maine	33.8	31.3	2.5	16 8	19.9	
Escanaba, Michigan*						
Galveston, Texas	54.0	43.0	11.0	14 10	55.3	
Grand Haven, Michigan†	29.0	29.0	0.0	19 0	23.6	
Indianola, Texas	66.9	39.7	27.2	8 7	54.0	
Jacksonville, Florida	71.0	60.0	11.0	18 0	64.3	
Key West, Florida	78.0	73.3	4.7	16 8	75.0	
Mackinaw City, Michigan*						
Marquette, Michigan*						
Milwaukee, Wisconsin*						
Mobile, Alabama	63.5	52.5	11.0	15 11	59.6	
New Haven, Connecticut	32.8	30.1	2.7	14 4	27.6	
New London, Connecticut†	35.0	33.0		11 10	30.4	
Newport, Rhode Island	34.9	31.4	3.5	9 10	30.5	
New York City	34.2	30.2	4.0	10 6	31.4	
Norfolk, Virginia	52.0	43.0	9.0	16 9	45.8	
Pensacola, Florida	67.7	56.7	11.0	17 7	60.9	
Portland, Maine	31.5	30.0	1.5	18 11	25.7	
Portland, Oregon	41.6	29.9	11.7	50 9	33.1	
Port Eads, Louisiana	45.8	42.3	3.5	9 7	61.8	
Provincetown, Massachusetts	34.5	31.0	3.5	14 0	29.7	
Punta Rassa, Florida	78.0	65.6	12.4	11 2	70.7	
Sandusky, Ohio*						
Sandy Hook, New Jersey	36.0	31.4	4.6	1 5	32.6	
San Francisco, California	50.6	46.1	4.5	29 2	47.9	
Savannah, Georgia	61.8	49.6	12.2	12 5	60.1	
Smithville, North Carolina	51.0	46.0	5.0	10 0	52.1	
Toledo, Ohio*						
Wilmington, North Carolina	59.0	46.0	13.0	13 0	54.7	

* Frozen. † Observations incomplete. See text.

The largest monthly ranges of water-temperature are: In-

dianola, Texas, 27°; Cedar Keys, Florida, 18°; Wilmington, North Carolina, 13°; Punta Rassa, Florida, 12° 4'; Savannah, Georgia, 12° 2'. The smallest are: Portland, Maine, 1° 5'; Eastport, Maine, 2° 5'; New Haven, Connecticut, 2° 7'; Boston, Massachusetts, 2° 9'; Newport, Rhode Island, 3° 5'; Port Eads, Louisiana, 3° 5'; Provincetown, Massachusetts, 3° 5'; Block Island, Rhode Island, 3° 8'.

ATMOSPHERIC ELECTRICITY.

AUROSAS.

The most extensively observed display of the month occurred on the 24th. It was observed on the New England coast, and from the upper Mississippi valley westward as far as Oregon and Washington Territory.

The aurora of the 27th was observed in New England, the Lake region, and thence westward to Montana.

Extended displays occurred in the northwest on the 25th, 28th; and in northern New England on the 1st, 4th, 5th, 13th, and 28th.

The most southerly points at which auroras were observed during the month are Cape Hatteras, North Carolina, on the 14th, and Visalia, California, on the 3d and 4th.

The observer at Saint Vincent, Minnesota, reports auroras on the 1st, 2d, 6th, 20th, 24th, and 28th.

Numerous other displays, not here noted, were reported in the northern districts.

ATMOSPHERIC ELECTRICITY INTERFERING WITH TELEGRAPHIC COMMUNICATION, ETC.

Fort Davis, Texas, 11th.

Captain Vogelgesang, of the s. s. "Silesia," reports that, during the gales encountered between N. 50° 53', W. 23° 00', and N. 49° 41', W. 32° 22', from the 7th to 9th, the atmosphere was filled with electricity. The tops of masts, yards, and all iron stays were tipped with electric light, and a sudden aberration of the compass of 22½ points to the northward was twice observed, which disappeared with the extinction of the electric light on the yards and stays. There was also felt one heavy stroke of lightning, which went down the funnel, causing a blast of fire to come out of the funnel, and lighting the stoke-hole, steerage, and cabins with an electric light. It sounded like a heavy gunshot, but no thunder was heard. The electricity was most felt before the setting in of the squall.

THUNDER-STORMS.

Thunder-storms were reported in the various states and territories, as follows:—

Alabama.—Mobile, 23d, 24th; Auburn, 24th; Green Springs, 24th.

Arizona.—Fort Apache, 20th; Fort Grant, 20th; Prescott, 20th; Camp Thomas, 20th.

Arkansas.—Little Rock, 2d, 3d, 14th; Fort Smith, 3d, 4th.

California.—San Francisco, 13th; Sacramento, 14th.

Florida.—Pensacola, 9th, 24th; Jacksonville, 12th, 16, 18th.

Illinois.—Thunder-storms were reported from numerous stations throughout the state, as follows: 2d, 3d, 6th, 14th, 15th, 16th.

Indiana.—Logansport, 2d; Lafayette, 3d; Wabash, 3d; Laconia, 15th.

Indian Territory.—Fort Sill, 12th, 14th.

Iowa.—Thunder-storms were reported from numerous stations throughout the state on the 15th and 16th; at Fort Madison on the 2d, 3d, 23d; Burlington, 2d; Des Moines, 3d.

Kansas.—Reported by various stations throughout the state on the 3d, 13th, 15th, 16th, and at Creswell on the 21st.

Kentucky.—Bowling Green, 10th.

Louisiana.—Shreveport, 11th, 12th, 14th; Port Eads, 1st, 17th, 24th; New Orleans, 23d; Point Pleasant, 24th.

Massachusetts.—Worcester, 4th; Westborough, 4th.

Michigan.—Were generally reported throughout the state on the 15th and 16th; at Hillsdale, on the 14th; and at Otisville, on the 17th.

Mississippi.—Starkville, 12th, 16th; Vicksburg, 11th, 12th, 16th, 23d, 24th.